A PORTABLE ELECTRIC HERBARIUM DRIER

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A problem which has consistently troubled the botanist is the drying of herbarium specimens in the field. Various methods relied on in the past include the use of kerosene lanterns (Lundell, 1956) or oil stoves (MacDaniels, 1930) to more unique drying methods employing the heat from shipboard engine rooms or placing specimen presses above an automobile engine (Fernald, 1945). These drying methods are prone to varying degrees of success, dependent on the heating method and temperature used. Fernald (1945) concluded that plant specimens dried, using artificial heat, were likely to fracture or fragment, lose natural coloration and lose some of their diagnostic characters such as glaucescence. The use of forced air, with and without heat (Maillefer, 1944) and an electric drier for herbarium specimens using heating elements (Gates, 1950) have been presented to eliminate some of the problems of specimen drying. The requirement for expedience in drying herbarium specimens while in the field is important. Botanists have become all too familiar with the results of allowing damp specimens to be transported from the field to the laboratory and observing the subsequent toll taken by molds and fungi.

The objective was to develop a portable electric herbarium drier which is durable, reliable, collapsible (Fig. 1) for easy transporting and does not present a fire or fume hazard.

MATERIALS & METHODS

The increasing importance of efficiently using limited time in the field necessitates a system which will dry specimens in a reasonable period and eliminate the effects of molds and fungi. Dimensions for the construction of this

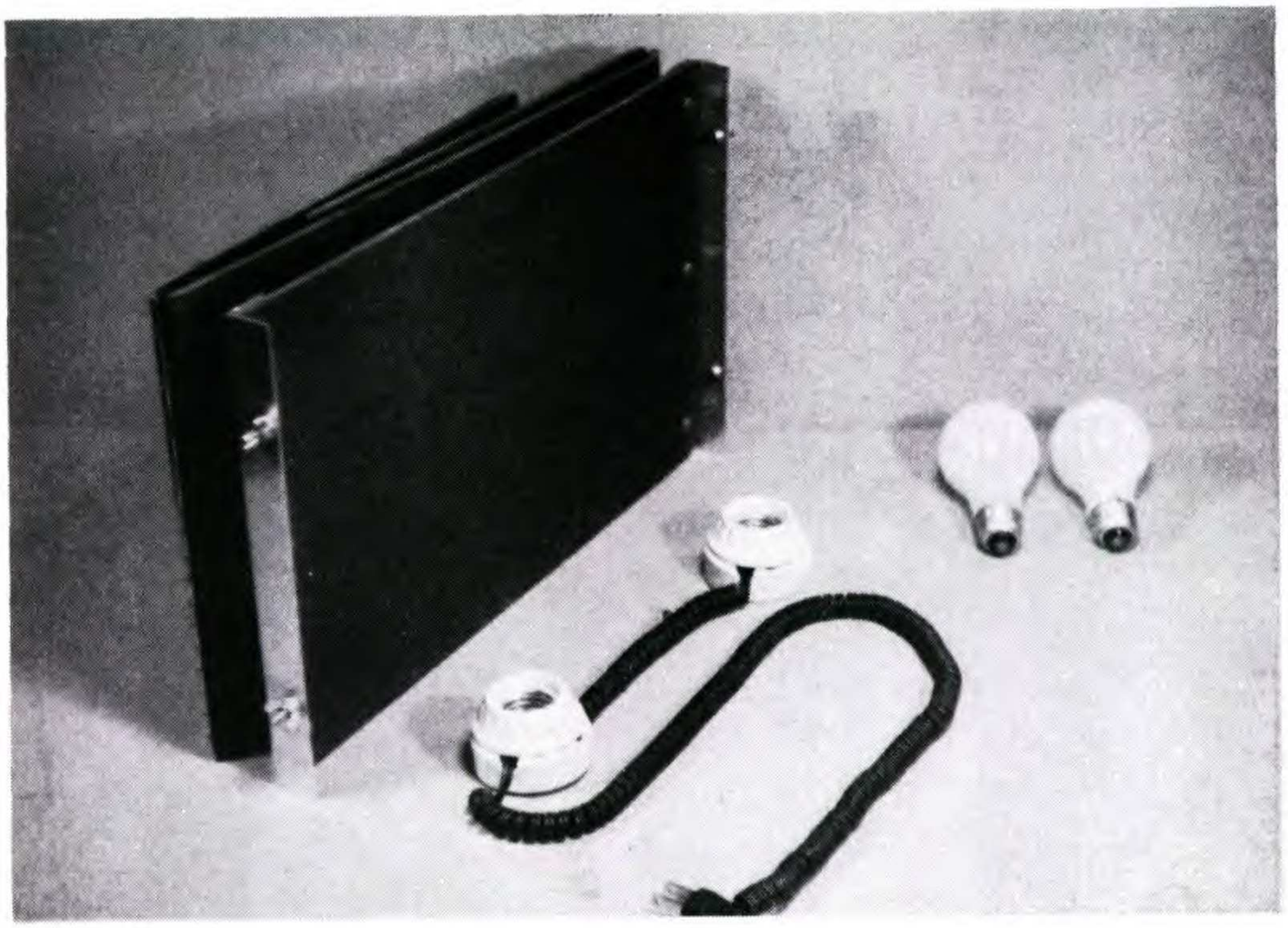

Fig. 1

plant drier are given in the accompanying drawing (Fig. 2). The drier can be built from locally available materials in one to two hours for a cost of under ten dollars. All sides of the drier are ¼-inch hardboard material. It is recommended after cutting the hardboard sides for the drier that the inside corners of the hardboard be beveled at a 45° angle for clearance when the continuous hinge is opened to assemble the drier for use. Small rivets or fasteners should be used to attach the continuous hinge and aluminum angle to the sides of the drier. It is important to alternate the placement of the fasteners for the continuous hinge to permit adequate clearance when assembled. When the aluminum angle is attached to the long side of the drier, the entire drier should be assembled to allow accurate drilling of holes for the wing-nut and screw fasteners for the removable side of the drier. After pilot holes are drilled, the holes on the interior of the hardboard sides should be countersunk to provide clearance. Two 1½-inch auger holes are drilled in the centers of the two

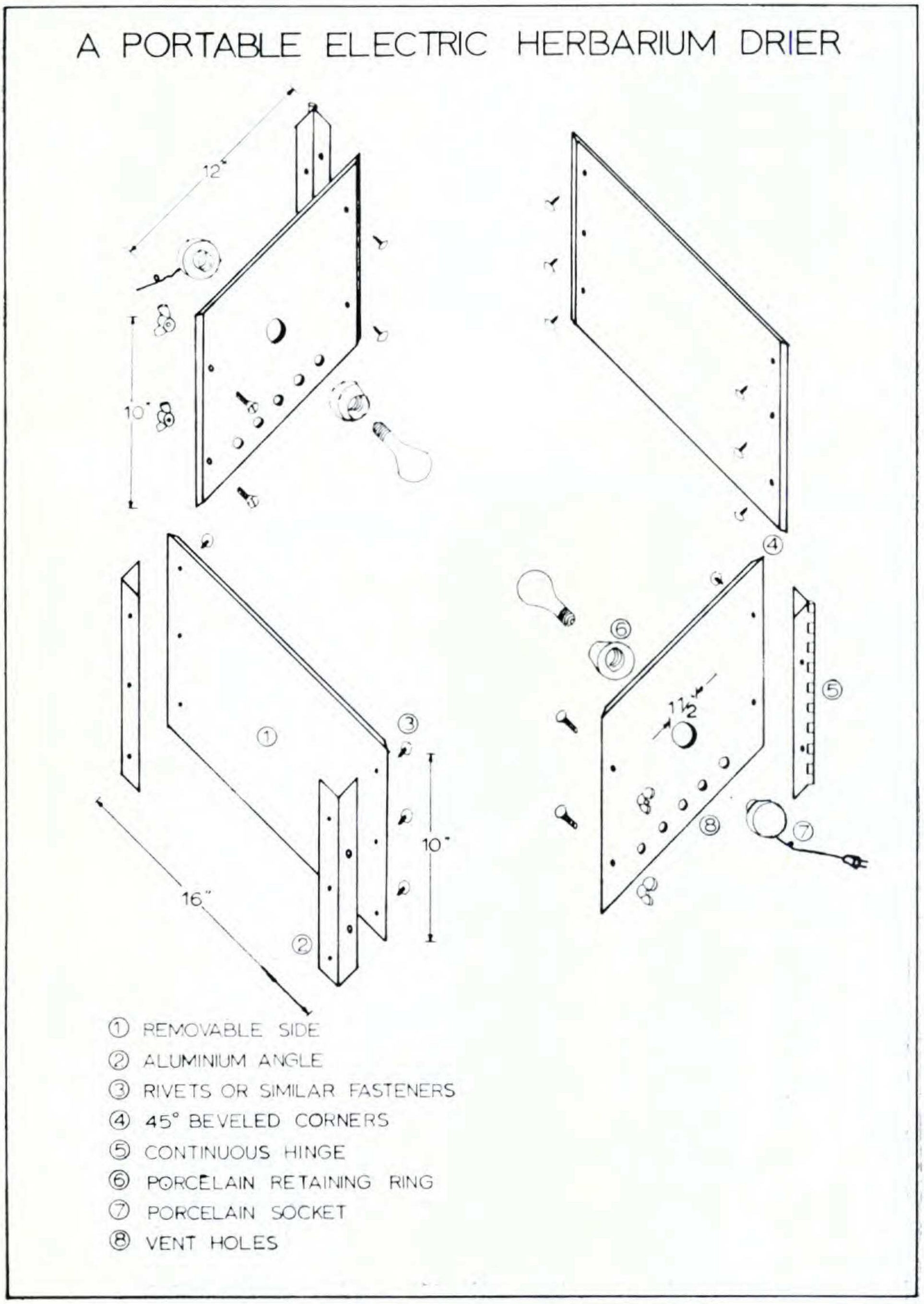
A PORTABLE ELECTRIC HERBARIUM DRIER
12"
10"
16"
10"
1½"
① REMOVABLE SIDE
② ALUMINIUM ANGLE
③ RIVETS OR SIMILAR FASTENERS
④ 45° BEVELED CORNERS
⑤ CONTINUOUS HINGE
⑥ PORCELAIN RETAINING RING
⑦ PORCELAIN SOCKET
⑧ VENT HOLES

Fig. 2

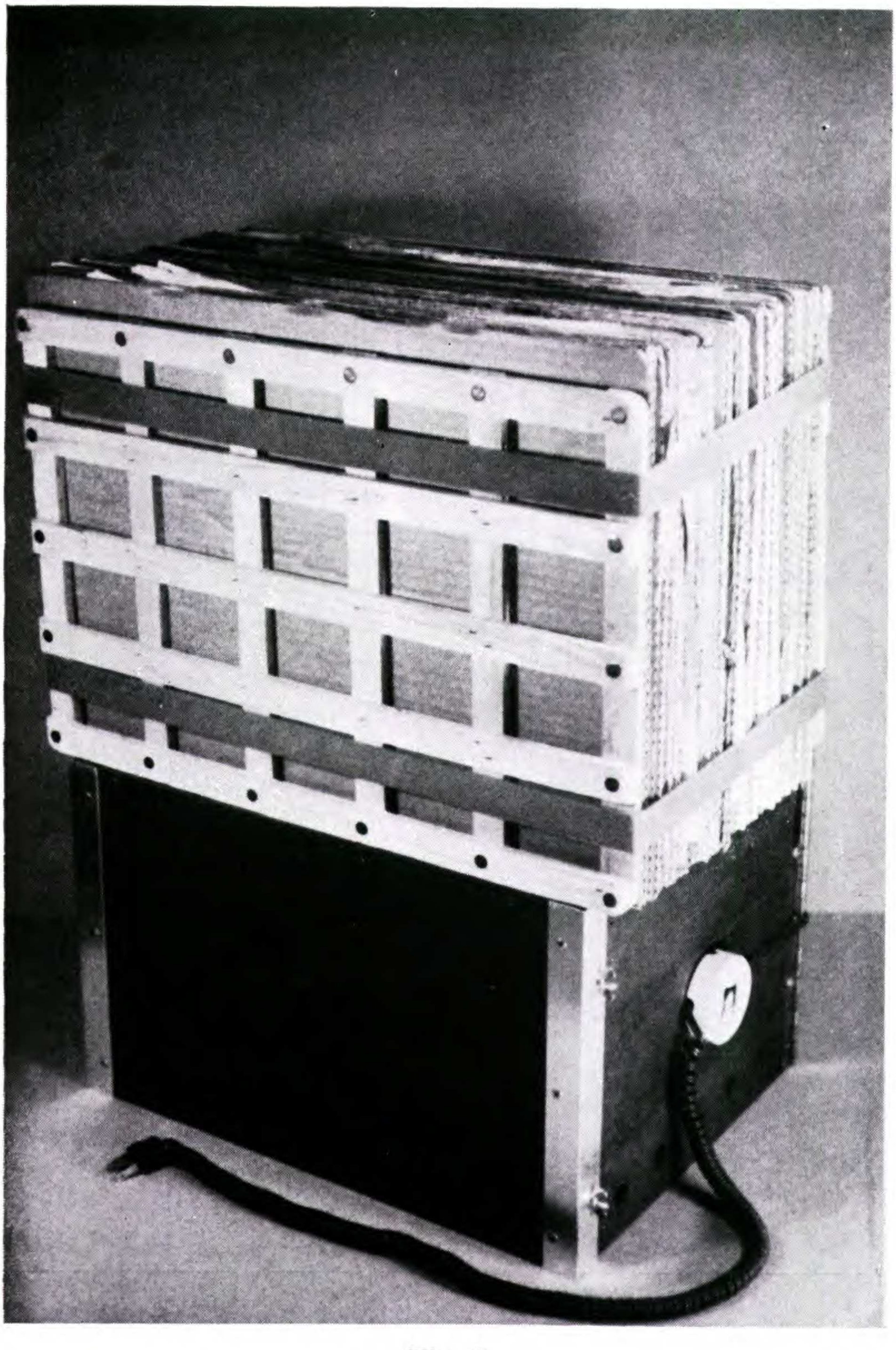

Fig. 3

short sides of the drier. A series of five ¾-inch auger holes are drilled toward the bottom of the two short sides of the drier to increase air flow. Two porcelain sockets are wired and inserted through the 1½-inch auger holes and are secured by tightening the porcelain retaining ring. The fully assembled drier is then set on a flat surface, a plant press set over the top opening and power is supplied as shown in the accompanying photograph (Fig. 3). Provision may be made for use of 6 or 12 volt D.C. automotive lamps when using power supplied from a field vehicle. The temperature and the drying time can be easily regulated by installing various wattage incandescent lamps. Further regulation of temperature is possible by using an incandescent lamp dimmer in the light circuit. By this means, the heat can be varied over a considerable range dependent on the requirements of the botanist. The circulation of heated air is by convection currents which pass through the press and carry moisture out of the press. The possibility of using a small fan was investigated but the advantages of forced air are outweighed by using the drier without fan, which is capable of drying specimens in 10-15 hours. An advantage of the convection drying system is that it provides a uniform, constant heating source.

NOTE: Open coil resistance elements of the porcelain cone variety are not recommended for use with this drier due to the possible fire hazard and the high temperatures which these coils develop.

RESULTS & DISCUSSION

The method of herbarium specimen drying described herein allows adequate time for "sweating" the specimen. In addition, blotters may be changed and "tame" specimens adjusted prior to the final drying stage, a concern of Steyermark (1947). Observation during drying of specimens indicates that control of the heat to the specimen is of utmost importance. Camp (1946) presents a qualitative but useful rule applicable here which is, "When a press is too hot for the hand it is too hot for the specimens." The

general maximum temperatures accepted in the literature vary from 102°F (Maillefer, 1944) to 120°F (Fernald, 1945). This portable herbarium drier is designed to deliver from 90°F to 120°F dependent on the wattage of the incandescent lamps used.

This portable herbarium drier has several distinct advantages over other drying methods:

1. It is portable, durable, collapsible (Fig. 3) and light weight.
2. It presents no fire or fume hazard to the specimens in the field or laboratory.
3. The heat may be varied to accommodate different specimens.
4. The drier is inexpensive to construct.

This Portable Electric Herbarium Drier was designed to adapt to a wide range of field and laboratory conditions, though modifications of this basic design can be implemented to suit the individual. Institutions or individuals with limited space and budget for herbarium drying equipment should find this a time and space saving method for the preparation of specimens.

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